Lead in Drinking Water:

Background
&
2 Case Studies

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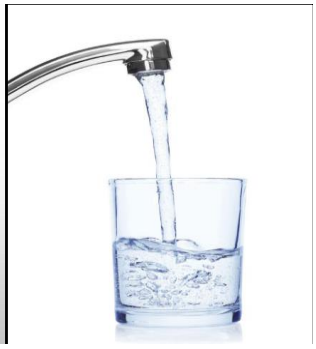


HOW DOES LEAD GET INTO WATER?

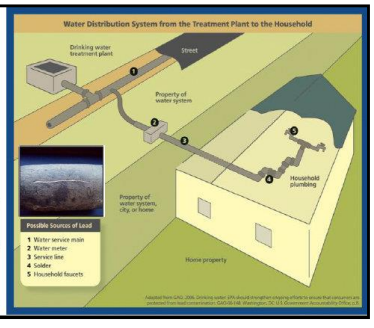
Lead is not naturally occurring in water but is dissolved into the drinking water through corrosion.

Depending on the chemical characteristics the water may dissolve lead from solder or lead pipes.

Lead enters the water as it travels thru leaded service lines (in the street) or from the plumbing within the home (premise plumbing).

Sources of Lead in Drinking Water

- Ductile iron main
- Lead service lines (LSLs)
  - Banned in 1986
  - Source of 50-75% of lead at tap (Sandvig 2008)
- Leaded brass
  - Meters, faucets, valves, connectors, etc
  - 8% lead allowed in "non-leaded" pipe (pre-2014)
  - Discharged enough lead to produce 2.4 IQ deficit in children consuming 2L of water/day (Maas 2005)
- Leaded solder
  - Common in homes before 1986



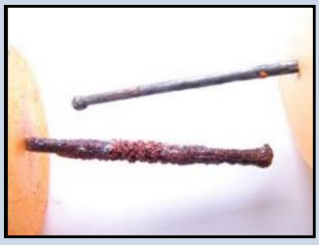
HOW DOES LEAD GET INTO WATER?

The amount of lead corroded in metal plumbing generally increases as water corrosively increases.

The corrosive water can corrode brass faucets & fixtures.

Corrosive water also degrades copper plumbing which produces pin holes in the pipes and results in a blue-green staining.

Generally, acidic water having a pH less than 7 and is low in calcium carbonate is more corrosive.



2 identical nails placed in 2 glasses of drinking water for 1 month.

Water in one glass came from Flint, the other from Detroit.

Can you guess which one is which?

HOW MUCH LEAD IN WATER IS TOO MUCH?

Since lead serves **no beneficial purpose in the human body**, it is best if drinking water contains **NO LEAD**.

EPA has set the action limit of lead in public drinking water at **15 ppb** (EPA Lead & Copper Rule).

DPH Private Well Program also follows this EPA guidance.

HOW DO I KNOW IF MY WATER HAS LEAD?

Have the water tested:

If you have a **PRIVATE WELL**: Contact a state accredited water testing lab and the DPH Private Well Program. For a list of labs go to the Lead Program website and (www.ct.gov/dph/lead) and click on the Certified Lead Testing Laboratories link.

If you are on a **PUBLIC WATER SYSTEM**: Contact your water supply company or a private lab at the link above. Additional information is available from the DPH Drinking Water Section (DWS).

REGULATORY BACKGROUND

Public drinking water suppliers are required under the federal **Safe Drinking Water Act (SDWA)** to test for many contaminants including lead, and when necessary, provide corrosion control to prevent lead from entering drinking water.

The **Lead and Copper Rule (LCR)** requires supplier to monitor tap water lead concentrations in high risk homes (older homes built prior to 1978).

REGULATORY BACKGROUND

In **1986,** Sect 1417 of SDWA limited the content of lead in pipes & other materials used in water supplies, defining **"lead free"** as < **8% lead in pipes** and < **0.2% in solder.**

In **Jan 2014**, the EPA modified Sect 1417 of SDWA to redefine **"lead free".**

JANUARY 2014 - EPA

REDUCTION OF LEAD IN DRINKING WATER ACT

THE ACT HAS REDUCED THE LEAD CONTENT ALLOWED IN WATER SYSTEM AND PLUMBING PRODUCTS BY **CHANGING THE DEFINITION OF LEAD FREE** IN SECTION 1417 OF THE SAFE DRINKING WATER ACT (SDWA) FROM **NOT MORE THAN 8% LEAD CONTENT, TO NOT MORE THAN A WEIGHTED AVERAGE OF 0.25% LEAD** WITH RESPECT TO THE WETTED SURFACES OF PIPES, PIPE FITTINGS, PLUMBING FITTINGS, AND PLUMBING FIXTURES.

EPA

Lead Free Requirement

The *Reduction of Lead in Drinking Water Act* went into effect on January 4, 2014. The Act has reduced the lead content allowed in water system and plumbing products by changing the definition of lead free in Section 1417 of the Safe Drinking Water Act (SDWA) from not more than 8% lead content, to not more than a weighted average of 0.25% lead with

How to Identify Lead Free Certification Marks for Drinking Water System & Plumbing Products

Is lead free certification required for products?

As of March 2015, there is no mandatory federal requirement for lead free product testing or third-party certification under the Safe Drinking Water Act (SDWA).* However, consumers can increase their level of confidence by purchasing products that have been certified as meeting the lead free requirement of the SDWA. If a product has not been certified, it may still meet the lead free requirement—in this case, contacting the manufacturer would be the best way to confirm the lead content.

**There may be additional state or local laws pertaining to the allowed lead content of pipes, pipe fittings, and plumbing fittings and fixtures, some of which require product certification or testing.*

How do I know if a product has been certified as lead free?

In the United States, there are eight American National Standards Institute (ANSI) accredited third-party certification bodies that provide product certification to the SDWA lead free requirement for manufacturers of drinking water system and plumbing products (see Table on Page 2 for list of certification bodies). Each of these certification bodies has a registered trademark that they use to certify a multitude of products for various requirements; however, the trademark alone does not necessarily mean that the product has been certified to the lead free requirement.

2 RECENT CASE STUDIES

CASE #1: 1yr old, 33 venous, 2 family home built in 1953

CASE #2: 3yr old, 10 venous, condo complex built in 1983

CASE #1

Background:

- Child's 1st blood lead test at 1yr well visit: RESULT: **33 venous.**
- Child living in a home constructed in **1953** that in **2013** was gutted and completely remodeled due to a house fire.
- Lead inspection: all interior & exterior **paint is intact.** One small area on exterior identified as lead based (out of reach of child).
  - **Dust** wipe testing: all within acceptable limits
  - **Soil:** all within acceptable limits

13

CASE # 1

Water test results: 1st draw kitchen sink: **520 ppb**

2nd draw kitchen sink: **6.3 ppb**
(2 minute flush)

ACTION LIMIT FOR LEAD IN WATER: 15 ppb

Family notified & switched to drinking bottled water

14

CASE # 1

Additional background:

- Shallow dug well
- Sibling, 3 months old with a 7 venous
- 2nd round of testing: kitchen sink (1st draw) : **720 ppb**

15

CASE # 1

LHD reached out to DPH L&HHP & Private Well Section

- Recommended visual inspection of well head and pump, pressure tank, and service lines
- Recommended additional testing including General Water Quality Parameters (pH, hardness, alkalinity)

16

CASE # 1

3rd round of testing and visual inspection revealed:

- Testing revealed water had a pH of 6.6 and was very corrosive
- Most of interior plumbing is plastic PEX tubing
- Well pump & service line to house had been replaced

17

CASE # 1

Next steps:

- Property owner notified and opted to replace kitchen and bathroom faucets
- Additional water testing conducted to try to isolate source of lead at specific faucets
- Water testing done in Unit A, results >15 ppb
- Tenants in Unit A provided bottled water

18

CASE # 1

Interesting findings:

Water results:	Kitchen sink (initial):	520 ppb
	New faucet*:	870 ppb
	Bathroom (initial):	760 ppb
	New faucet*:	870 ppb

* New faucets labeled as complying with new EPA rule

19

CASE # 1

Interesting findings:

- Property owner reached out to plumber who did work following the fire (2014). All sections of pipe (both copper and pex) that could be accessed were replaced.
- Last round of 1st draw sampling still found lead >15 ppb
  - Kitchen 14 ppb
  - Bathroom 19 ppb

20

CASE # 1

Of Interest:

While changing out faucets, brass, copper, and soldered plumbing lines did reduce the amount of lead in the water it *did not eliminate it*.

It is often impossible to evaluate every soldered junction because they are hidden in the walls.

21

CASE # 1

Of Interest:

All flushed samples came back with lead levels between 3.5ppb and <1.0 ppb

Property owner installed NSF approved water filters on the new faucets

22

CASE # 1

Take away:

- Ensure water testing is done for all EBLL investigations
- Identify the source: public water or private well
- Changing faucets or plumbing lines may not solve the problem
- Faucets made AFTER Ja 2014 must contain < .25 % Pb
- Faucets made prior to Jan 2014 can have as much as 8% lead
  - These faucets are still available on store shelves
- NSF reviews and approves filters that reduce lead in water

23

AVAILABLE DPH FACT SHEETS

Lead in Private Drinking Water Wells:
Go to: www.ct.gov/dph/lib/dph/environmental_health/pdf/Lead_in_PDWW.pdf
and consult with DPH Private Well Section staff (revised guidance coming soon)

Lead in Drinking Water:
Go to: www.ct.gov/dph/lib/dph/drinking_water/pdf/lead.pdf
and consult with DPH Drinking Water Section staff

AVAILABLE FACT SHEETS

Lead in Drinking Water:
What To Know If You Are a Renter or Condo Owner
www.wkkf.org/resource-directory/resource/2016/08/lead-in-drinking-water-what-to-know-if-you-are-a-renter-or-condo-owner

Lead in Drinking Water:
What To Know If You Are a Homeowner
www.wkkf.org/resource-directory/resource/2016/08/lead-in-drinking-water-what-to-know-if-you-are-a-homeowner

25

EPA & NSF LINKS

Information on the Reduction of Lead in Drinking Water Act:
www.epa.gov/dwstandardsregulations/section-1417-safe-drinking-water-act-prohibition-use-lead-pipes-solder-and

NSF International Certified Lead Filtration Devices:
info.nsf.org/Certified/DWTU/listings_leadreduction.asp?ProductFunction=053%7cLead+Reduction&ProductFunction=058%7cLead+Reduction&ProductType=&submit2=Search

26

CASE # 2

Background:

- Child's 1st blood lead test at 3yr well visit: RESULT: **10 venous**
- Child living in a condo constructed in **1983**
- Child's level very slow to drop - pediatrician recommended parents test the drinking water
- Drinking water tested at private lab - Results: **29 ppb**

27

CASE # 2

Background:

- Pediatrician notified the LHD and the DPH L&HHP of elevated results
- Condo complex served by a municipal public water system
- LHD sampled the 3 sinks within the unit

	1st draw	2nd draw
Kitchen	58	12
1st flr bath	210	3
2nd flr bath	12	0

28

CASE # 2

Investigation:

- L&HHP consulted with DPH DWS staff
- Second round of testing scheduled to include WQP
  - DWS notified the water supplier who contacted the LHD
- Parents advised to: clean the aerators (they trap corroded debris) flush water in sinks then do not use for 8 hrs continue to drink bottled water

29

CASE # 2

Investigation:

- Parents replace kitchen faucet
- 2nd round of testing:

	1st draw	2nd draw
Kitchen	34	<1
1st flr bath	21	<1
2nd flr bath	3.4	<1

- Results indicate a issue with the internal plumbing because flush samples are <1

30

CASE # 2

Investigation:

- Water company evaluated the service lines (in street & complex)
  - Installed sampling tap at meter to the complex (H_20 - ok)
  - Found deficiencies w/water lines owned by the complex
    - Complex required by water co. to install 2 hydrants (they were on approved plan but not installed in 1983)

31

CASE # 2

Follow up:

- LHD, water supplier, and mayor schedule a meeting with unit owners to notify them of the test results and proposed solutions
  - Residents were:
    - Offered water testing at no-cost
    - Provided info on lead in water & how to reduce exposure
- Condo complex moving forward with upgrades to supply lines

32

CASE # 2

Take away:

- **Lead in solder was NOT banned until 1986**
- Changing faucets or plumbing lines may not solve the problem
- Faucets made **AFTER Jan 2014** must contain **< 0.25 % Pb**
- Faucets made **BEFORE Jan 2014** can have as much as **8% lead**
  - These faucets still available on store shelves
- NSF reviews and approves filters that reduce lead in water

33

CASE # 2

Take away:

- Test water for lead to ensure it's not a source of lead exposure
  - 10v BLL took 9 months to drop to 5 - at what cost to the child?
  - GOOD catch by pediatrician!!
- Communication & coordination- **CRITICAL!!**

34

FINAL TAKE AWAY

These are the **FIRST 2 cases** in CT of an child being poisoned (BLL > 5) due to elevated levels of lead in drinking water

(no other sources of lead found in the homes)

35

QUESTIONS,

COMMENTS,

CONCERNS?

36

For additional info…

CT DPH L &HHP:	860 509-7299
DPH Private Well Program:	860 509- 7293
DPH Drinking Water Program:	860 509-7359